



① Publication number: **0 486 214 A3**

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EUROPEAN PATENT APPLICATION

⑪ Application number: **91310283.6**

⑤ Int. Cl.⁶: **C12N 15/54, C12N 9/10,
C12N 15/11, C12N 5/10,
A01H 5/00**

⑫ Date of filing: **06.11.91**

⑩ Priority: **14.11.90 US 613160**

⑬ Date of publication of application:
20.05.92 Bulletin 92/21

⑭ Designated Contracting States:
AT BE CH DE DK ES FR GB GR IT LI NL SE

⑮ Date of deferred publication of search report:
19.11.92 Bulletin 92/47

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⑲ **Putrescine N-methyltransferase, recombinant DNA molecules encoding putrescine N-methyltransferase, and transgenic tobacco plants with altered nicotine content.**

⑳ There is provided highly purified tobacco putrescine N-methyltransferase, a process for its purification, and production of PMT DNA sequence. The purification process includes the step of applying a tobacco root extract to an anion exchange medium and specifically eluting putrescine N-methyltransferase with an elution buffer comprising putrescine.

EP 0 486 214 A3



European Patent
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EUROPEAN SEARCH REPORT

Application Number

EP 91 31 0283
Page 1

| DOCUMENTS CONSIDERED TO BE RELEVANT | | | |
|---|--|--|--|
| Category | Citation of document with indication, where appropriate, of relevant passages | Relevant to claim | CLASSIFICATION OF THE APPLICATION (Int. CLS) |
| D,X | CHEMICAL ABSTRACTS, vol. 76, 1972, Columbus, Ohio, US; abstract no. 55697, MIZUSAKI, S., ET AL.: 'Phytochemical studies on tobacco alkaloids. XIV. Occurrence and properties of putrescine N-methyltransferase in tobacco roots' | 1,2 | C12N15/54 C12N9/10 C12N15/11 C12N5/10 A01H5/00 |
| Y | * abstract * & PLANT CELL PHYSIOL. vol. 12, no. 4, 1971, pages 633 - 640; | 15-23 | |
| Y | EP-A-0 240 208 (CALGENE) 17 October 1987 * page 4, line 27 - line 28 * | 15,17, 19-21,23 | |
| Y | PLANT MOLECULAR BIOLOGY, vol. 15, no. 1, July 1990, DORDRECHT, THE NETHERLANDS, pages 27 - 38; HAMILL, J.D. ET AL.: 'Over-expression of a yeast ornithine decarboxylase gene in transgenic roots of Nicotiana rustica can lead to enhanced nicotine accumulation' * page 37, right column, paragraph 1 * | 15,16, 18,20-22 | |
| | | | TECHNICAL FIELDS SEARCHED (Int. CLS) |
| | | | C12N A01H |
| D,A | CHEMICAL ABSTRACTS, vol. 105, 1986, Columbus, Ohio, US; abstract no. 112135, FETH, F., ET AL.: 'Regulation in tobacco callus of enzyme activities of the nicotine pathway. I. The route ornithine to methylpyrrolidine' * abstract * & PLANTA vol. 168, no. 3, 1986, pages 402 - 407; | 1-23 | |
| The present search report has been drawn up for all claims | | | |
| Place of search THE HAGUE | | Date of completion of the search 16 SEPTEMBER 1992 | Examiner MADDOX A. D. |
| CATEGORY OF CITED DOCUMENTS | | T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : number of the same patent family, corresponding document | |
| X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document | | | |

EPO FORM 694 (01/91) (F001)



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EUROPEAN SEARCH REPORT

Application Number

EP 91 31 0283
Page 2

| DOCUMENTS CONSIDERED TO BE RELEVANT | | | |
|---|---|---|---|
| Category | Citation of document with indication, where appropriate, of relevant passages | Relevant to claim | CLASSIFICATION OF THE APPLICATION (Int. Cl.5) |
| A | CHEMICAL ABSTRACTS, vol. 92, 1980, Columbus, Ohio, US; abstract no. 177499, OHTA, S., ET AL.: 'Metabolic key step discriminating nicotine production callus strain from ineffective one' * abstract * & BIOCHEM. PHYSIOL. PFLANZ, vol. 175, no. 4, 1980, pages 382 - 385; | 1-23 | TECHNICAL FIELDS SEARCHED (Int. Cl.5) |
| A | CHEMICAL ABSTRACTS, vol. 106, 1987, Columbus, Ohio, US; abstract no. 99481, WAGNER, R., ET AL.: 'The regulation of enzyme activities of the nicotine pathway in tobacco' * abstract * & PHYSIOL. PLANT, vol. 68, no. 4, 1986, pages 667 - 672; | 1-23 | |
| A | THE PLANT CELL, vol. 2, no. 1, January 1990, ROCKVILLE, MD, USA, pages 7 - 18; LAGRIMINI, L.M., ET AL.: 'Peoxidase-induced wilting in transgenic tobacco plants' * page 16, left column, last paragraph * | 15, 16, 18, 20-22 | |
| The present search report has been drawn up for all claims | | | |
| Place of search THE HAGUE | | Date of completion of the search 16 SEPTEMBER 1992 | Examiner MADDOX A. D. |
| CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background : non-written disclosure P : intermediate document | | T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons ----- & : member of the same patent family, corresponding document | |

EPO FORM 150 (01/82) (P.001)